

1. A car starts out slowly, then goes faster and faster until it gets a flat tire which must be fixed before proceeding. Sketch a graph of the distance traveled as a function of time.
2. You make T-shirts. You have fixed costs of \$200 and variable costs of \$7 per shirt. Find the cost equation. If you sell the shirts for \$12 each, find the break-even point ?
3. The depth of water in a tank oscillates once every 8 hours. The smallest depth is 2.6 feet and the largest is 9.3 feet. Find a formula for the depth as a function of time.
4. You are selling iced cappuccino's. If you charge one dollar, you end up making 800 sales every week. Each dime increase in price results in 15 fewer sales. Find and graph the demand curve. Assume it is linear.
5. You have a budget for textbooks and social events of \$1600. Textbooks cost \$80 each. A night out costs \$40. Find and graph the equation of your budget constraint. Shade in the region of living within your means. What do points on the axes represent ?
6. Suppose $f(10) = 83.1$ and $f(40) = 24.7$. Find two possible values for $f(70)$, one if f is linear and the other if f is exponential.
7. The population of Podunk grows at an annual rate of 7.25%. If initially there were 150,000 inhabitants, how long before the population reaches one million ?
8. The half-life of Mobiliium is 7 hours. How long before 18 grams decays into 12 grams
9. Estimate the rate of change of $y = 2^x$ at $x = 1$ using the intervals $[1, 1.5]$ and $[1, 1.1]$.
10. How is the graph of $y = 3f(x + 7) - 9$ gotten from that of $y = f(x)$?
11. Let $f(v)$ be the fuel efficiency of a car in mpg that is driven at an average speed v mph. What would $f'(70) = -2$ tell you ?
12. Suppose $P(t)$ is a price of a stock as a function of time. What does the statement "the stock price has fallen and is bottoming out" say about the sign of $P'(t)$ and $P''(t)$?
13. Suppose you know for a fact that the derivative of $f(x) = \ln(x)$ is $f'(x) = 1/x$. Find the equation of the tangent line at $x = 2$.
14. Sketch the graph of a function defined for whose first derivative is always negative but whose second derivative starts out positive and changes it sign twice.
15. Suppose $MR(100) = 45$ and $MC(100) = 12$. Estimate the additional profit made by increasing the production to a level of $q = 105$.
16. A ball is tossed up in the air. Sketch a graph of the velocity.
17. Sketch a graph of cost and revenue functions. Graphically represent profit.
18. Sketch a graph of a function with $f(2) = 10$, $f'(2) = -1$ and $f''(2) = 0$.
19. A frozen pizza takes a trip from the freezer, to the oven, and then to your plate. Let $T(t)$ be its average internal temperature. Sketch the graphs of $T(t)$ and $T'(t)$.
20. Review all the quizzes, lectures, homework, and everything else.